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CENTRAL FAX CENTERAMENDMENTS TO THE CLAIMS

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The following listing of claims will replace all prior versions and listings of claims in the application.

**LISTING OF CLAIMS**

1. (currently amended) A fuel processing system comprising:
  - a fuel supply;
  - a first reactor having an inlet receiving fuel from said fuel supply and an outlet discharging a first reformate containing hydrogen, said first reactor operable to reform said fuel to form said first reformate; and
  - a second reactor having an inlet receiving fuel from said fuel supply and an outlet discharging a second reformate containing hydrogen, said second reactor operable to reform said fuel to form said second reformate, and said second reactor being coupled in parallel with said first reactor with said first and second reformates combining to form a reformate flow,  
wherein said first reactor is an autothermal reforming reactor and said second reactor is a steam reforming reactor and said first and second reactors operate at different pressures.

- 2-4. (cancelled)

5. (original) The fuel processing system of claim 1, wherein thermal energy is extracted from said first reformate and used as a heat input for said second reactor.

6. (original) The fuel processing system of claim 1, wherein thermal energy is extracted from said first reformate and used to vaporize a feed stream supplied to said second reactor.

7. (original) The fuel processing system of claim 1, wherein thermal energy is extracted from at least one of said first and second reformates to heat an oxidant supplied to said first reactor.

8. (original) The fuel processing system of claim 1, further comprising a catalytic oxidizer reacting a portion of said reformate flow to heat a downstream reactor.

9. (original) The fuel processing system of claim 1, wherein said first reactor has a first transient response time and said second reactor has a second transient response time that is greater than said first transient response time.

10. (currently amended) The ~~method~~ fuel processing system of claim 1, wherein said first reactor has a first response time and a first hydrogen reformate capacity and said second reactor has a second response time and a second hydrogen reformate capacity and said first and second response times and hydrogen reformate capacities provide adequate hydrogen to a fuel cell stack operation over all transients and ranges of said fuel cell stack operation.

11. (currently amended) A fuel cell system comprising:
  - a fuel supply;
  - an oxidant supply;
  - a first reactor having an inlet receiving fuel from said fuel supply and an outlet discharging a first reformate containing hydrogen, said first reactor operable to reform said fuel to form said first reformate;
  - a second reactor having an inlet receiving fuel from said fuel supply and an outlet discharging a second reformate containing hydrogen, said second reactor operable to reform said fuel to form said second reformate, and said second reactor being coupled in parallel with said first reactor with said first and second reformates combining to form a reformate flow downstream of said second reactor without said first reformate flowing through said second reactor; and
  - a fuel cell stack receiving an oxidant flow from said oxidant supply and said reformate flow, said fuel cell stack producing electricity from said oxidant and reformate flows.

12. (original) The fuel cell system of claim 11, wherein said first reactor is a partial oxidation reactor and said second reactor is a steam reforming reactor.

13. (original) The fuel cell system of claim 12, wherein said first reactor is an autothermal reformer.

14. (original) The fuel cell system of claim 12, wherein said first reactor is an autothermal reformer which can operate as a partial oxidation reactor or autothermal reformer.

15. (original) The fuel cell system of claim 11, wherein said first and second reactors operate at different pressures.

16. (original) The fuel cell system of claim 11, further comprising a catalytic oxidizer reacting a portion of said reformate flow to heat a downstream reactor.

17. (original) The fuel cell system of claim 11, further comprising a preferential oxidation reactor reacting a portion of said reformate flow and generating heat.

18. (original) The fuel cell system of claim 11, wherein thermal energy is extracted from said first reformate and used to heat a downstream reactor.

19. (original) The fuel cell system of claim 11, wherein thermal energy is extracted from said first reformate and used to vaporize a feed stream supplied to said second reactor.

20. (original) The fuel cell system of claim 11, wherein thermal energy is extracted from at least one of said first and second reformates to heat an oxidant supplied to said first reactor.

21. (original) The fuel cell system of claim 11, wherein said first reactor has a first transient response time and said second reactor has a second transient response time that is greater than said first transient response time.

22. (currently amended) A fuel processor comprising:

a fuel supply;

an autothermal reactor having an inlet receiving fuel from said fuel supply and an outlet discharging a first reformate containing hydrogen, said autothermal reactor operable to reform said fuel to form said first reformate; and

a steam reforming reactor having an inlet receiving fuel from said fuel supply and an outlet discharging a second reformate containing hydrogen, said steam reforming reactor operable to reform said fuel to form said second reformate, and said steam reforming reactor being coupled in parallel with said autothermal reactor with said first and second reformates combining to form a reformate flow,

wherein said autothermal reactor has a first transient response time and said steam reforming reactor has a second transient response time that is greater than said first transient response time.

23. (currently amended) The fuel processing system of claim 22, wherein thermal energy is extracted from said first reformate and used to heat said steam reforming reactor without flowing through said steam reforming reactor.

24. (original) The fuel processing system of claim 23, further comprising a combustor that reacts a combustor oxidant flow heated with said thermal energy extracted from said first reformate and a fuel flow to heat said steam reforming reactor.

25. (original) The fuel processing system of claim 22, wherein said autothermal reactor operates at a lower pressure than said steam reforming reactor.

26. (original) The fuel processing system of claim 22, wherein thermal energy is extracted from said first reformate and used to vaporize a feed stream supplied to said steam reforming reactor.

27. (original) The fuel processing system of claim 22, wherein thermal energy is extracted from at least one of said first and second reformates and used to heat an oxidant supplied to said autothermal reactor.

28. (original) The fuel processing system of claim 22, further comprising a catalytic oxidizer reacting a portion of said reformate flow to heat a downstream reactor.

29. (cancelled)

30. (currently amended) A method of operating a fuel processing system to produce a reformate flow containing hydrogen at a predetermined rate, the method comprising the steps of:

- (a) determining a target H<sub>2</sub> production rate;
- (b) producing a first reformate flow containing hydrogen at a first rate in a first reactor receiving fuel from a fuel supply, said first reactor being an autothermal reactor and produces said first reformate in at least one of a partial oxidation reaction and a steam reforming reaction in said autothermal reforming reactor;
- (c) producing a second reformate containing hydrogen at a second rate in a second reactor receiving fuel from said fuel supply, said second reactor operating in parallel with said first reactor, said second reactor being a steam reforming reactor and produces said second reformate in a steam reforming reaction;
- (d) combining said first and second reformate flows to form a third reformate flow containing hydrogen; and
- (e) adjusting at least one of said first and second rates so that said reformate flow is produced at said target H<sub>2</sub> production rate,

wherein during a cold start-up of the fuel processing system step (b) includes producing at least a portion of said first reformate flow in a partial oxidation reaction and step (e) includes adjusting at least one of said first and second rates so that all of said third reformate flow is provided by said first reformate flow.

31. (original) The method of claim 30, wherein step (b) further comprises producing all of said first reformate flow in an autothermal reforming reaction in said first reactor.

32. (original) The method of claim 30, wherein step (b) further comprises producing at least a portion of said first reformate flow in a partial oxidation reaction in said first reactor.

33. (original) The method of claim 30, wherein step (b) further comprises producing at least a portion of said first reformate flow in a steam reforming reaction in said first reactor.

34. (currently amended) The method of claim 33, wherein step (e) further comprises adjusting at least one of said first and second rates so that a majority of said third reformate flow is provided by said second reformate flow during nominal operation of the fuel processing system.

35. (original) The method of claim 33, further comprising the step of removing CO from said reformate flow in a low temperature shift reactor.

36. (cancelled)

37. (currently amended) The method of claim 36 30, wherein said partial oxidation reaction occurs at an oxygen to carbon ratio of at least 1.0.

38. (currently amended) The method of claim 36 30, further including the steps of:

(f) removing H<sub>2</sub>O from said third reformat flow in an H<sub>2</sub>O adsorber; and

(g) removing CO from said third reformat flow in a CO adsorber.

39. (currently amended) The method of claim 38, further comprising the steps of:

(h) releasing adsorbed H<sub>2</sub>O from said H<sub>2</sub>O adsorber into said third reformat flow as said H<sub>2</sub>O adsorbent is heated beyond an H<sub>2</sub>O adsorbent retention temperature; and

(i) releasing adsorbed CO from said CO adsorber into said third reformat flow as said CO adsorbent is heated beyond a CO adsorbent retention temperature.

40. (original) The method of claim 30, wherein step (e) includes adjusting said first rate so that said first reformat provides a majority of an upward transient change in said target H<sub>2</sub> production rate during an upward transient operation of the fuel processing system.

41. (original) The method of claim 40, wherein step (b) further comprises producing a change in said first rate by increasing a portion of said first reformat produced in a partial oxidation reaction.

42. (original) The method of claim 30, wherein said step (e) further comprises adjusting said second rate so that said second reformat provides a majority of a downward transient change in said target H<sub>2</sub> production rate during a downward transient operation of the fuel processing system.

43. (original) The method of claim 42, wherein step (e) further comprises restricting said second reformat and increasing pressure in said second reactor.

44. (original) The method of claim 30, wherein step (b) includes producing said first reformat in a partial oxidation reaction in said first reactor and step (c) includes producing said second reformat in a steam reforming reaction in said second reactor.

45. (cancelled)

46. (original) The method of claim 30, wherein step (b) is performed at a first pressure and step (c) is performed at a second pressure different from said first pressure.

47. (original) The method of claim 30, further comprising the steps of:

- (f) extracting thermal energy from said first reformat; and
- (g) using said extracted thermal energy to heat said second reactor.

48. (original) The method of claim 30, further comprising the steps of:

- (f) extracting thermal energy from said first reformat; and
- (g) using said extracted thermal energy to vaporize a feed stream to said second reactor.

49. (original) The method of claim 30, further comprising the steps of:

- (f) extracting thermal energy from at least one of said first and second reformates; and
- (g) heating an oxidant flow supplied to said first reactor with said extracted thermal energy.

50. (currently amended) The method of claim 30, further comprising the steps of:

- (f) reacting a portion of said third reformat flow in a catalytic oxidizer to produce thermal energy; and
- (g) heating a downstream reactor with said thermal energy produced by said catalytic oxidizer.

51. (original) The method of claim 30, wherein said first reactor has a first transient response time and said second reactor has a second transient response time that is greater than said first transient response time.